IN THE CLAIMS

1. (Currently Amended) A method of manufacturing a rigid foam board consisting essentially of:

incorporating nano-particle nucleating agents into a polymer melt, said nano-particle nucleating agents being selected from the group consisting of nanosheets of graphite, intercalated graphites and expanded graphites and having a particle size in at least one dimension of less than 100 nanometers;

incorporating a blowing agent into the polymer melt under a first pressure and at a first temperature;

extruding the polymer melt under a second pressure and at a second temperature, the second pressure and second temperature being sufficient to allow the polymer melt to expand and form a foam board having a solid foam structure; and

cooling the foam board, said foam board having an average cell size between 60 μm and 120 μm and having a cell size distribution,

wherein said foam board comprises at least 90% closed cells, and[[;]]

wherein the polymers in said polymer melt consist of at least one ~~includes an~~ alkenyl aromatic polymer material and optionally one or more non-alkenyl aromatic polymer.

2. (Currently Amended) A method of manufacturing a rigid foam board according to claim 1:

wherein the alkenyl aromatic polymer material includes at least one alkenyl aromatic polymer selected from alkenyl aromatic homopolymers, copolymers of alkenyl aromatic compounds and copolymerizable ethylenically unsaturated comonomers.

3. (Currently Amended) A method of manufacturing a rigid foam board according to claim 1 ~~2~~:

wherein the polymer melt includes a major portion of said at least one alkenyl aromatic polymer material, said alkenyl aromatic polymer material being selected from the group consisting of the polymerization products of styrene, α-methylstyrene, chlorostyrene, bromostyrene, ethylstyrene, vinyl benzene and vinyl toluene; and

a minor portion of said ~~a~~ non-alkenyl aromatic polymer.

4. (Currently Amended) A method of manufacturing a rigid foam board according to claim 3:

wherein the polymer melt includes at least 80 wt% polystyrene.

5. (Currently Amended) A method of manufacturing a rigid foam board according to claim 1 ~~2~~:

wherein the blowing agent includes at least one composition selected from aliphatic hydrocarbons having 1-9 carbon atoms, halogenated aliphatic hydrocarbons having 1-4 carbon atoms, carbon dioxide, nitrogen, water, azodicarbonamide and p-toluenesulfonyl.

6. (Previously Presented) A method of manufacturing a rigid foam board according to claim 5:

wherein the blowing agent includes at least one composition selected from methane, methanol, ethane, ethanol, propane, propanol, n-butane, isopentane, carbon dioxide, nitrogen, water, azodicarbonamide, p-toluenesulfonyl, HCFC-142b and HCFC-134a.

7. (Currently Amended) A method of manufacturing a rigid foam board according to claim 2, further comprising:

incorporating an additive ~~into the polymer melt~~ before forming the foam.

8. (Previously Presented) A method of manufacturing a rigid foam board according to claim 7:

wherein the additive includes at least one composition selected from flame retardants, mold release agents, pigments and fillers.

9. (Canceled)

10. (Currently Amended) A method of manufacturing a rigid foam board according to claim 2:

wherein the nano-particle nucleating agents ~~nano-particles~~ are incorporated into the polymer melt at a rate between 0.01 and 10 weight percent, based on polymer weight.

11. (Currently Amended) A method of manufacturing a rigid foam board according to claim 2:

wherein the nano-particle nucleating agents ~~nano-particles~~ are incorporated into the polymer melt at a rate between 0.5 and 5 weight percent, based on polymer weight.

12. (Currently Amended) A method of manufacturing a rigid foam board according to claim 11:

wherein the alkenyl aromatic polymer material includes a major portion of polystyrene, polyethylene or polymethyl methacrylate.

13. (Currently Amended) A method of manufacturing a rigid foam board according to claim 10:

wherein the nano-particle nucleating agents ~~nano-particles~~ are formed by a technique selected from intercalation with polystyrene and exfoliation of expandable graphite particles in a polystyrene or polymethyl methacrylate matrix.

14. (Previously Presented) A method of manufacturing a rigid foam board according to claim 2, wherein:

the average cell wall thickness is less than about 10 μm;

the average strut diameter is less than about 20 μm;

the cell orientation is between about 0.5 and 2.0; and

the foam density is less than about 100 kg/m^3.

15. (Previously Presented) A method of manufacturing a rigid foam board according to claim 14, wherein:

the average cell wall thickness is between about 0.2 and about 1.0 μm;

the average strut diameter is between about 4 and about 8 μm;

the cell orientation is between about 1.0 and about 1.5; and

the foam density is between about 20 and about 50 kg/m^3.

16.- 26. (Canceled)

27. (Currently Amended) A method of manufacturing a rigid foam product comprising:

incorporating nano-graphite nucleating agents into a polymer melt in an amount between about 0.01 and 10 weight percent, based on polymer weight, the polymer in said polymer melt consisting of ~~including~~ an alkenyl aromatic polymer material and optionally, a non-alkenyl aromatic polymer, and said nano-graphite nucleating agents having a particle size in at least one dimension of less than 100 nanometers and being selected from the group consisting of nanosheets of graphite, intercalated graphite and expanded graphite;

incorporating a blowing agent into the polymer melt under a first pressure and at a first temperature;

extruding the polymer melt under a second pressure and at a second temperature, the second pressure and second temperature being sufficient to allow the polymer melt to expand and form a foam product having a solid foam structure; and

cooling the solid extruded foam product,

wherein said foam product comprises at least 90% closed cells.

28. (Canceled)

29. (Currently Amended) The method according to claim 27, wherein the alkenyl aromatic polymer material includes at least one alkenyl aromatic polymer selected from alkenyl aromatic homopolymers, copolymers of alkenyl aromatic compounds and copolymerizable ethylenically unsaturated comonomers.

30. (Currently Amended) The method according to claim 29, wherein the alkenyl aromatic polymer material includes a major portion of at least one alkenyl aromatic polymer selected from the group consisting of the polymerization products of styrene, α-methylstyrene, chlorostyrene, bromostyrene, ethylstyrene, vinyl benzene and vinyl toluene.

31. (Previously Presented) The method according to claim 27, wherein the blowing agent includes at least one composition selected from aliphatic hydrocarbons having 1-9 carbon atoms, halogenated aliphatic hydrocarbons having 1-4 carbon atoms, carbon dioxide, nitrogen, water, azodicarbonamide and p-toluenesulfonyl.

32. (Previously Presented) The method according to claim 27, wherein the blowing agent includes at least one composition selected from methane, methanol, ethane, ethanol, propane, propanol, n-butane, isopentane, carbon dioxide, nitrogen, water, azodicarbonamide, p-toluenesulfonyl, HCFC-142b and HCFC-134a.

33. (Canceled)

34. (Previously Presented) The method according to claim 27, wherein the nano-graphite is incorporated into the polymer melt in an amount between about 0.5 and 5 weight percent, based on polymer weight.

35. (Previously Presented) The method according to claim 27, wherein the rigid foam product has a density ranging from about 10 to about 500 kg/m^3.

36. (Previously Presented) The method according to claim 27, wherein the rigid foam product is extruded into the shape of a rigid board.

37. (New) The method according to claim 27, wherein the foam product has an average cell size between 60 μm and 120 μm.

38. (New) The method according to claim 1, further comprising incorporating a conventional nucleation agent with said nano-particle nucleating agents.

39. (New) The method according to claim 1, wherein the cell size distribution is bimodal, with a first peak centered between 50 μm and 120 μm and a second peak centered above 200 μm.

40. (New) The method according to claim 1, wherein said alkenyl aromatic polymer material is formed entirely of polystyrene.

41. (New) The method according to claim 27, wherein said alkenyl aromatic polymer material is formed entirely of polystyrene.